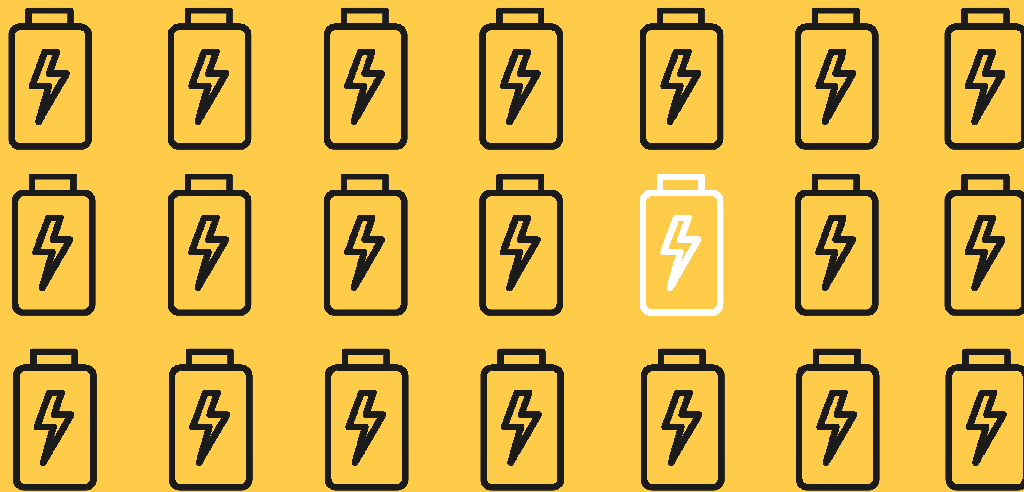


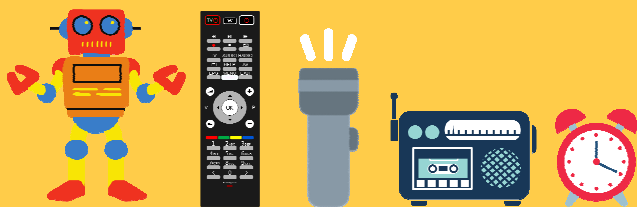
BATTERY RECYCLING IN THE EU & TAIWAN

歐盟與台灣的電池回收



TYPES OF BATTERIES 電池種類

ALKALINE BATTERIES 一般電池、鹼性電池



ZINC MANGANESE BATTERY 鋅錳電池
(CARBON ZINC BATTERY 碳鋅電池)



MERCURY BATTERY
水銀電池

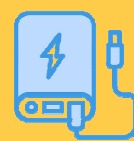
RECHARGEABLE BATTERIES 充電電池(二次電池)



NICKEL-CADMIUM BATTERY
鎳鎘電池
NICKEL-METAL HYDRIDE BATTERY
鎳氫電池



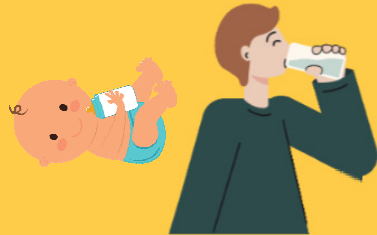
NICKEL-MANGANESE
BATTERY
鎳錳電池



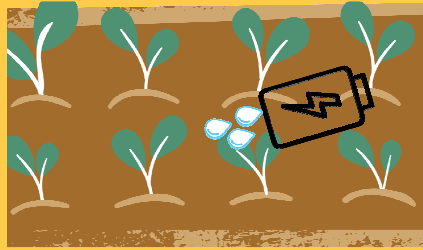
LITHIUM
BATTERY
鋰電池

HOW BATTERY LEAKAGE ENTERS HUMAN BODIES

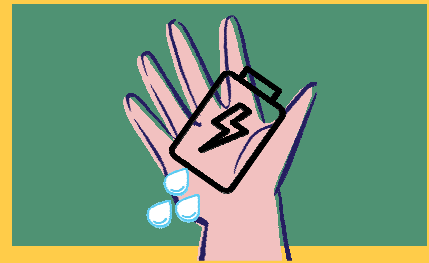
電池漏液如何進入人體



**THROUGH
DRINKING WATER**
透過飲水



THROUGH CROPS
透過農作物



THROUGH TOUCH
透過觸碰

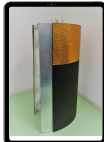
SYMPTOMS CAUSED BY OVEREXPOSURE TO CHEMICAL ELEMENTS IN BATTERIES

過度暴露於電池金屬元素會產生的症狀

REMINDER:

If you want to know more elements inside the batteries, please check our battery model.

小提醒：想知道更多電池成分請參考我們的電池模型



24

Mn

錳

(Manganese)

- Brain Problems: Nervous System 腦部傷害：中樞神經病變
- Hearing, Vision, body & Speech Difficulties 聽力、視力、肢體及說話障礙
- Dementia 失智



This element is in the 3rd layer of the battery
此元素在電池第三層

30

Zn

鋅

(Zinc)

- Dermatitis 皮膚炎
- Anemia 貧血
- Respiratory Diseases 呼吸道疾病



This element is in the 3rd layer of the battery
此元素在電池第五層

28

Ni

鎳

(Nickel)

- Immune System Damage 免疫力受損
- Dermatitis 皮膚炎
- Respiratory Diseases 呼吸道疾病
- Cancer 癌症

48

Cd

鎘

(Cadmium)

- Fragile Bones: Rickets & Itai-itai Disease 骨質酥鬆：軟骨症、痛痛病
- Cardiovascular Disease 心血管疾病
- Prostate Cancer 前列腺癌

80

Hg

汞

(Mercury)

- Brain Problems: Nervous System 腦部傷害：中樞神經病變
- Minamata Disease 水俣病
- Hearing, Vision, body & Speech Difficulties 聽力、視力、肢體及說話障礙
- Dementia 失智

EU's Action Towards Battery Issues 歐盟針對電池問題的行動



THE EU BATTERY DIRECTIVE (2006) 歐盟發佈電池指令(2006)

OBJECTIVES : A partial ban on portable nickel-cadmium batteries excluding batteries used in medical equipment, emergency lighting and alarm systems, and cordless power tools.
部分指令禁止可攜式鎳鎘電池，不含用於醫療設備、緊急照明、警報系及充電式工具中使用的電池。

The Battery Directive defines targets for the **collection rates of portable batteries and accumulators**.

電池指令定義了可攜式電池和蓄電池的回收率目標。

- 2012: 25%
- 2016: 45%
- 17 member states reached 45% or more. The highest rate is 96%
- 17 個歐盟成員國的回收率達到45%或以上。最高回收率高達96%

Highlights 總圖表重點：

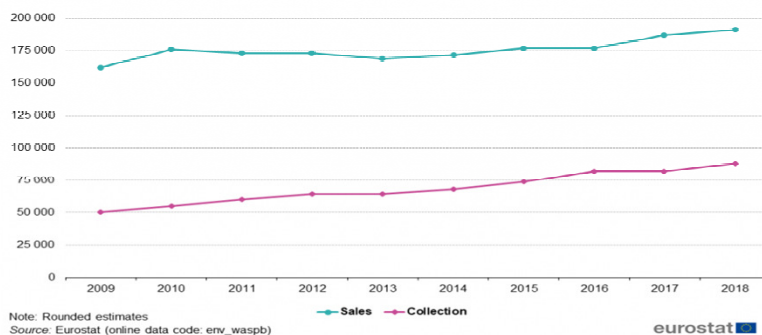
- In 2018, close to **46%** of portable batteries sold in the EU were collected for recycling.

2018年：有近48%歐盟售出的可攜式電池已當成廢棄物回收。

Scan this QR code
for more information on
the EU Battery Directive 2006



Sales and collection of portable batteries and accumulators, European Union, 2009–2018
(tonnes)



New EU Battery Directive
...on the way



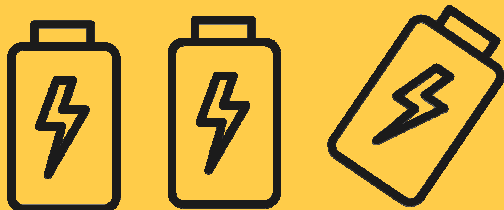
The European Commission proposes to modernize EU legislation on batteries. The proposal addresses the social, economic and environmental issues related to all types of batteries.

歐盟執委會提議使歐盟電池的法規現代化；該提案解決了所有與電池相關的社會、經濟和環境問題。

- 1** Batteries placed on the EU market should become sustainable, high-performing and safe all along their entire life cycle.
歐盟市場的電池在整個電池壽命裡都應要有永續、高性能及安全。
- 2** Providing legal certainty for innovative and sustainable batteries.
為創新和永續的電池提供法律明確性。
- 3** Minimizing environmental impact of batteries.
將電池對環境的影響降到最低。

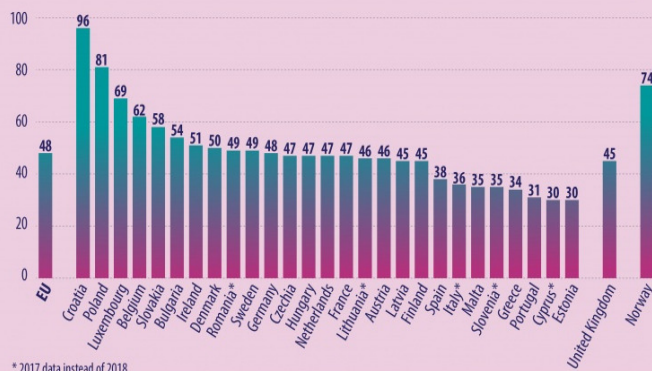
Scan this QR code for more information on the
Proposal for a new REGULATION on Batteries (2020)





Portable batteries and accumulators collected for recycling

(%, data estimated on the last three years of sales, 2018)



* 2017 data instead of 2018

ec.europa.eu/eurostat



POLAND AND CROATIA LEAD EU BATTERY RECYCLING

波蘭和克羅埃西亞

領導歐盟的電池回收



Data released by Eurostat shows that Croatia has the highest level of battery recycling in the EU with over 96%, followed by Poland with 81.2%

歐盟統計局發布的數據顯示，克羅埃西亞是歐盟電池回收率最高的國家，超過96%。而其次則是波蘭，達到81.2%



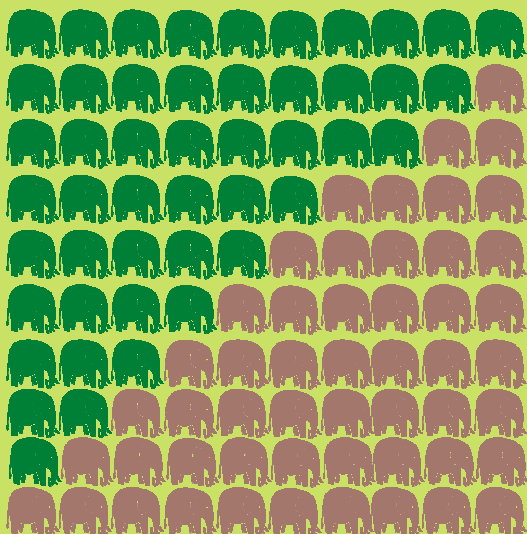
Most shops in Poland that sell electrical goods have collection places where customers can drop off their waste free of charge.

波蘭多數的電器產品店都設有收集站，客戶可在此免費丟棄廢物。



The new 5,000 Polish zloty fine may also comes with community service of cleaning up waste that has been dumped illegally. 波蘭有新的罰鍰(5,000波蘭茲羅提(Polish zloty)還可能加上社區服務)以清理非法傾倒的廢物。

Ministry of the Environment, Poland: 資料來源：波蘭的環境部長米哈烏·沃希 (www.thefirstnews.com)



2018: AMOUNT OF PORTABLE BATTERIES USED IN EU: 191,000 TONNES = 30,317 AFRICAN ELEPHANTS

2018年歐盟使用的可攜式電池數量為191,000噸，大約是30,317頭成年非洲雄象



COLLECTED BATTERIES (46%) 已收集的電池 (46%)

88,000 tonnes of used portable batteries were collected as waste to be recycled. 收集了88,000噸舊的可攜式電池作為廢棄物進行回收

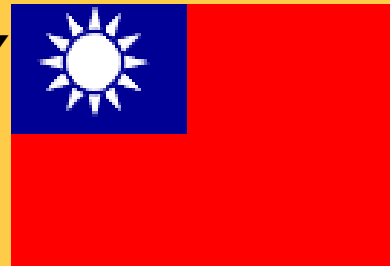


AN ADULT MALE AFRICAN ELEPHANT (THE LARGEST ANIMAL ON LAND) WEIGHING MAXIMUM 6.3 TONNES

事實上，一頭成年非洲雄象（陸地上最大的動物）最重可達6.3噸

THE BATTERIES RECYCLING POLICY IN TAIWAN

台灣電池回收政策



The 4-in-1 Recycling Program

Recycling batteries goes through household waste sorting by public communities, along with local authorities, recycling enterprises, and recycling fund. 電池回收的過程搭配著回收四合一制度，垃圾分類透過「社區民眾」，結合「地方當局」、「回收處理業」及「回收基金」之力量予以回收再利用。

四合一回收制度



PUBLIC 社區民眾 COMMUNITY

The reprocessing of general waste should comply with government regulations. Violators shall be fined from NT\$1,200 to NT\$6,000.

一般廢棄物的回收處理，若違反政府規定處新臺幣一千二百元到六千元。



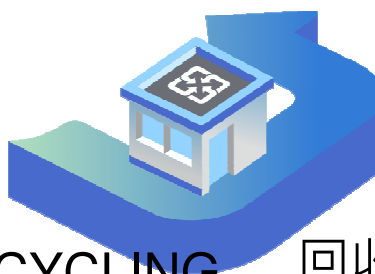
RECYCLING FUND 回收基金

Manufacturing and importing industries should pay recycling and disposal fees to the government as a recycling management fund. 製造業、輸入業應向政府繳納回收清除處理費，作為資源回收管理基金。



LOCAL 地方當局 AUTHORITIES

The waste sell-off must be allocated to the public and workers engaged in waste recycling. 政府回收變賣所得須依比例回饋民眾及廢棄物回收工作人員。



RECYCLING 回收 ENTERPRISES 企業

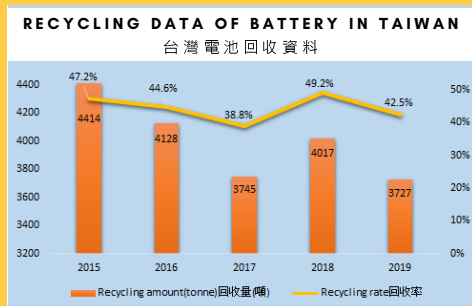
Recycling treatment plants acquire and handle waste from the public, communities, and local authorities. 回收處理廠可向民眾、社區、清潔隊收購並處理。

Source: Environmental Protection Administration, ROC (Taiwan) 圖片來源:行政院環保署官方網站



TAIWAN'S DRY BATTERIES RECYCLING

台灣的電池回收處理



This is a self-made chart. Source: EPA OpenData
圖表自製，資料來源：環保署環境資料開放平臺

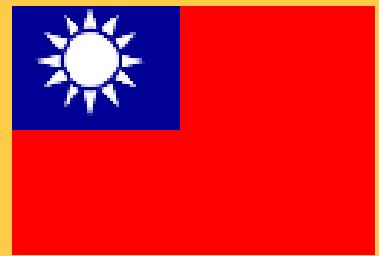
Source: (EPA Taiwan) <https://enews.epa.gov.tw/Page/3B3C62C78849F32F/dd716b6-cf59-4059-a900-76f3401ef950>
資料來源：環保署新聞網站

Recently, the recycling rate of battery in Taiwan is around 40%(about 4000 tonnes). And so far there are only 3 batteries recycling plants. 3 of them sold waste batteries abroad in Europe and Korea, such as France, Belgium, and Korea, which means most of the batteries were exported. However, due to the low average of the battery recycling rate, it became harder to support the dry batteries recycling plants in Taiwan.

近年來，台灣的廢乾電池回收率約為40%(約4000公噸)，目前台灣只有3間電池回收處理廠，其中3間做境外處理，出售給法國、比利時和韓國等歐亞國家，換句話說，回收乾電池以出口占多數。台灣回收率低的情況，亦使在境內處理廢電池的回收廠越來越難以支撐。

THE BATTERIES RECYCLING POLICY IN TAIWAN

台灣電池回收政策



WHERE DO BATTERIES GO?

電池去了哪裡？

Recycling Facilities

回收點



Convenience Stores
Retail Stores
超商、量販店業



Recycling Trucks
清潔隊回收車



Communities
Recycling Places
社區資源回收點



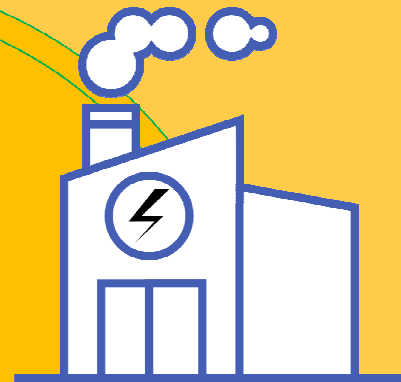
School
學校



Recycling Treatment
Industries
回收處理業



Telecommunication
Equipment Retailers
無線通信器材行



Recycling Plants

回收處理廠

3 steps of process 處理三步驟

1. **Crushing** 破碎

2. **Screening** 篩選

3. **Removing raw chemical materials**

containing valuable metals that can remanufacture a battery or can be sold to manufacturing industries, such as steel mills and shipyards.

負壓除汞(或其他化學原料)，篩選出具有價值的金屬原料可以再製電池或賣給製造業，例如鋼鐵、造船廠等。

Source from R-paper: <https://r-paper.epa.gov.tw/EDMDetail.aspx?id=d829c632-a3d8-48e8-ae6d-81bd62e19e2b>

圖片來源：回收綠報

Transport 運送



Battery Regulation

電池法規

- Started from 1 January 2021, Taiwan has banned the manufacturing and importing of these mercury-contained batteries.

2021年1月1日起含汞電池禁止製造及進口。



Any Ideas about Battery Recycling?

歡迎提出任何電池回收的想法！

YOUR OPINION MATTERS!

Drop your ideas in this ballot box :)

您的意見很重要，
快拿起一張意見表投票並寫下
您的點子或想法吧！
寫完請投進意見箱，謝謝！



Ballot Box

意見箱